

# NEW MEXICO Grade 6 SCIENCE *STANDARDS*

## **Strand I: Scientific Thinking and Practice**

**Standard I:** Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

**5-8 Benchmark I:** Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.

1. Construct appropriate graphs from data and develop qualitative and quantitative statements about the relationships between variables being investigated.
2. Examine the reasonableness of data supporting a proposed scientific explanation.
3. Justify predictions and conclusions based on data.

**5-8 Benchmark II:** Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.

1. Understand that scientific knowledge is continually reviewed, critiqued, and revised as new data become available.
2. Understand that scientific investigations use common processes that include the collection of relevant data and observations, accurate measurements, the identification and control of variables, and logical reasoning to formulate hypotheses and explanations.
3. Understand that not all investigations result in defensible scientific explanations.

**5-8 Benchmark III:** Use mathematical ideas, tools, and techniques to understand scientific knowledge.

1. Evaluate the usefulness and relevance of data to an investigation.
2. Use probabilities, patterns, and relationships to explain data and observations.

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## **Strand II: Content of Science**

**Standard I (Physical Science):** Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

### **5-8 Benchmark I:** Know the forms and properties of matter and how matter interacts.

1. Understand that substances have characteristic properties and identify the properties of various substances (e.g., density, boiling point, solubility, chemical reactivity).
2. Use properties to identify substances (e.g., for minerals: the hardness, streak, color, reactivity to acid, cleavage, fracture).
3. Know that there are about 100 known elements that combine to produce compounds in living organisms and nonliving substances.
4. Know the differences between chemical and physical properties and how these properties can influence the interactions of matter.

### **5-8 Benchmark II:** Explain the physical processes involved in the transfer, change, and conservation of energy.

1. Identify various types of energy (e.g., heat, light, mechanical, electrical, chemical, nuclear).
2. Understand that heat energy can be transferred through conduction, radiation and convection.
3. Know that there are many forms of energy transfer but that the total amount of energy is conserved (i.e., that energy is neither created nor destroyed).
4. Understand that some energy travels as waves (e.g., seismic, light, sound), including:
  - the sun as source of energy for many processes on Earth
  - different wavelengths of sunlight (e.g., visible, ultraviolet, infrared)
  - vibrations of matter (e.g., sound, earthquakes)
  - different speeds through different materials.

### **5-8 Benchmark III:** Describe and explain forces that produce motion in objects.

1. Know that every object exerts gravitational force on every other object dependent on the masses and distance of separation (e.g., motions of celestial objects, tides).
2. Know that gravitational force is hard to detect unless one of the objects (e.g., Earth) has a lot of mass.

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## **Strand II: Content of Science**

**Standard II (Life Science):** Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

**5-8 Benchmark I:** Explain the diverse structures and functions of living things and the complex relationships between living things and their environments.

1. Understand how organisms interact with their physical environments to meet their needs (i.e., food, water, air) and how the water cycle is essential to most living systems.
2. Describe how weather and geologic events (e.g., volcanoes, earthquakes) affect the function of living systems.
3. Describe how organisms have adapted to various environmental conditions.

**5-8 Benchmark II:** Understand how traits are passed from one generation to the next and how species evolve.

1. Understand that the fossil record provides data for how living organisms have evolved.
2. Describe how species have responded to changing environmental conditions over time (e.g., extinction, adaptation).

**5-8 Benchmark III:** Understand the structure of organisms and the function of cells in living systems.

1. Explain how fossil fuels were formed from animal and plant cells.
2. Describe the differences between substances that were produced by living organisms (e.g., fossil fuels) and substances that result from nonliving processes (e.g., igneous rocks).

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## **Strand II: Content of Science**

**Standard III (Earth and Space Science):** Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

**5-8 Benchmark I:** Describe how the concepts of energy, matter, and force can be used to explain the observed behavior of the solar system, the universe, and their structures.

### **Universe**

1. Describe the objects in the universe, including:
  - billions of galaxies, each containing billions of stars
  - different sizes, temperatures, and colors of stars in the Milky Way galaxy.

### **Solar System**

2. Locate the solar system in the Milky Way galaxy.
3. Identify the components of the solar system, and describe their defining characteristics and motions in space, including:
  - sun as a medium sized star
  - sun's composition (i.e., hydrogen, helium) and energy production
  - nine planets, their moons, asteroids.
4. Know that the regular and predictable motions of the Earth-moon-sun system explain phenomena on Earth, including:
  - Earth's motion in relation to a year, a day, the seasons, the phases of the moon, eclipses, tides, and shadows
  - moon's orbit around Earth once in 28 days in relation to the phases of the moon.

**5-8 Benchmark II:** Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape Earth's systems.

### **Structure of Earth**

1. Know that Earth is composed of layers that include a crust, mantle, and core.
2. Know that Earth's crust is divided into plates that move very slowly, in response to movements in the mantle.
3. Know that sedimentary, igneous, and metamorphic rocks contain evidence of the materials, temperatures, and forces that created them.

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## **Weather and Climate**

4. Describe the composition (i.e., nitrogen, oxygen, water vapor) and strata of Earth's atmosphere, and differences between the atmosphere of Earth and those of other planets.
5. Understand factors that create and influence weather and climate, including:
  - heat, air movement, pressure, humidity, oceans
  - how clouds form by condensation of water vapor
  - how weather patterns are related to atmospheric pressure
  - global patterns of atmospheric movement (e.g., El Niño)
  - factors that can impact Earth's climate (e.g., volcanic eruptions, impacts of asteroids, glaciers).
6. Understand how to use weather maps and data (e.g., barometric pressure, wind speeds, humidity) to predict weather.

## **Changes to Earth**

7. Know that landforms are created and change through a combination of constructive and destructive forces, including:
  - weathering of rock and soil, transportation, deposition of sediment, and tectonic activity
  - similarities and differences between current and past processes on Earth's surface (e.g., erosion, plate tectonics, changes in atmospheric composition)
  - impact of volcanoes and faults on New Mexico geology.
8. Understand the history of Earth and how information about it comes from layers of sedimentary rock, including:
  - sediments and fossils as a record of a very slowly changing world
7. evidence of asteroid impact, volcanic and glacial activity.

## **Strand III: Science and Society**

**Standard I:** Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

### **5-8 Benchmark I:** Explain how scientific discoveries and inventions have changed individuals and societies.

1. Examine the role of scientific knowledge in decisions (e.g., space exploration, what to eat, preventive medicine and medical treatment).
2. Describe the technologies responsible for revolutionizing information processing and communications (e.g., computers, cellular phones, Internet).